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**THE DIRECTOR OF CENTRAL INTELLIGENCE**

**WASHINGTON, D.C. 20505**

**National Intelligence Council**

DDI 3701-82
4 May 1982

MEMORANDUM FOR: Director of Central Intelligence

VIA : Chairman, National Intelligence Council

FROM : [redacted] 25X1
Acting National Intelligence Officer for USSR-EE

SUBJECT : US Policy Options on the Soviet Gas Export Pipeline

1. The essence of the Soviet export gas pipeline problem has not changed in the last year:

--Western Europe considers the project a means to energy diversification (France, FRG, Italy) and to European-made equipment sales to the USSR (the three countries above plus UK).

--The USSR wants to sell the gas to earn hard currency, strengthen its economic ties to Europe, and enhance its political influence in the region.

--Europeans reject the US arguments, asserting they are outweighed by other interests, or feel it is too late to stop the project. They do profess a desire not to become overly dependent on the USSR.

--Although original plans called for US equipment (primarily turbine rotors for the compressor stations and pipelayers,) the project can be completed without US equipment--albeit at some cost to the Soviets and with some delay.

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2. An important new development in late 1981 was the imposition of US sanctions against the USSR for its role in the Polish martial law declaration. Although these sanctions affect the pipeline in various ways (e.g. the denial of the Caterpillar pipelayers), their most important impact is on the provision of compressor stations. The original plan called for John Brown (UK), Nuovo Pignone (Italy) and AEG Kanis (FRG) to build the 120 compressor station turbines and for GE to supply the turbine rotor and shaft sets; a French company holding a GE license, Althsom-Atlantique (AA) was to supply another 40 sets [redacted] 25X1 [redacted] The 25 megawatt GE turbines are only 25X1 marginally more powerful than other Western turbines but are preferred by the Soviets because of their efficiency and high reliability. GE technology, therefore, makes the pipeline more efficient, but is not essential for it. Since substitution at this stage would require other modifications to the project (e.g. more turbines, different compressor station layouts) the Soviets have been simultaneously pressuring [redacted] 25X1 [redacted] the lifting of the US embargo, 25X1 negotiating [redacted] alternative sourcing for all the 25X1 necessary sets, investigating the capabilities of other Western manufacturers, and flaunting their own improved production capabilities--the main purpose of all of these activities probably being to bring about the delivery of the GE sets as called for in the original plans.

3. Although the Soviet preference for the GE sets attests to the costs imposed on the Soviets by the embargo, two other factors create a dilemma for the US: the joint Soviet-West European ability to complete the project without US equipment, and the likely high political cost to the Western alliance of an all-out US effort to deny US technology for the project. PM Thatcher has been particularly blunt in letting the US know that her government wold be highly irritated by a retroactive US denial of contracted equipment and the attendant loss of UK jobs. Although the FRG and Italian governments have not voiced their views so openly, they will undoubtedly make the same case in order to save their two firms from contractual default. Further, if the US were to make an all-out effort to deny the technology, it would have to pressure Althsom-Atlantique, either through GE's good offices [redacted] or 25X1 through extraterritorial pursuit (not likely to be successful in French courts) not to produce the sets. Although the sets need not be delivered to the USSR until the last phase of construction (about 1984-85), the production schedule of the European companies make it desirable for the US to make a decision in the near future.



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4. The US alternatives are three: an all-out effort to deny US technology, maintenance of the embargo but implicit approval of AA production of the sets, or lifting of the embargo on the sets. [redacted] 25X1
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[redacted]



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5. [redacted] the problem is complex and does not offer any very attractive solutions. US concerns about the pipeline, however, have already had some beneficial effects: an incalculable increase in European receptivity to restrict credits to the USSR and greater European interest in exploiting non-Soviet gas resources. Even though the two issues are not inherently linked, US-European disagreements about the pipeline has created a climate in which the Europeans are concerned about alienating the U.S. further.



6. Although success on the credits issue is by no means assured, the negotiations with the allies have now acquired the necessary momentum of their own and would probably be harmed by being explicitly linked to the pipeline. They should, therefore, proceed on a track parallel to, but separated from, the pipeline issue.

7. Increased European energy security is directly related to the pipeline and should be handled that way in our discussions with the Europeans. As shown in Attachment 2, the most promising possibilities for non-Soviet gas supplies lie in either increased Duth production or in a triangular Norway-UK-Netherlands supply arrangement (which could persuade the Dutch to increase their production before Norwegian deliveries start). For the Norwegians to play such a role, they must make the necessary investment decisions soon which, in turn, means that they must be assured of a large enough market. Consequently, if the Europeans, either on their own or under continued US urging (probably the latter) were to develop a plan for increased purchases from Norway, that country could make the appropriate investment decisions. Such a purchasing commitment in turn would decrease the amount of gas which Western Europe would need to buy from the USSR--thus going at least part way toward meeting the US objective of lessening European dependence on the USSR and Soviet hard currency earning capability. In return for such a European decision, the US could declare itself satisfied that this particular part of the embargo had fulfilled its objective (i.e. lessen Soviet marketing opportunities in the West) and allow GE to deliver the turbine sets which has been contracted before the 29 December embargo.

8. The preparations for the NATO as well as Versailles Summit present the opportunity to make this possibility clear to the Europeans. In essence, the U.S. needs an explicit private commitment from the Europeans that they will limit their purchases to the lowest amount possible under the current contract--a limit that would preclude the building of the second pipeline. In turn the US could pledge to let GE deliver the turbine sets under existing contracts and simultaneously ask for continued European cooperation in not undermining the other

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sanctions. If at all possible, this solution should be worked out before the NATO Summit and then announced in the communique in suitable diplomatic language.

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Attachments:
1. Soviet Paper on "Status of the Soviet-Western Europe Export Pipeline Project"
2. OGI Paper on "Diversifying European Gas Supplies"



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Export Pipeline

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# Status of the Soviet-Western Europe Export Pipeline Project


## Summary

Moscow has been stressing the high priority accorded the natural gas export pipeline project by Kremlin leaders. It is now more than ever a matter of national prestige, and the pipeline is going forward in the face of delays and rising costs. Since January the Soviets have been very active in efforts to circumvent the US embargo on critical gas turbine parts. Nonetheless, difficulties in lining up substitute parts may delay for some two years the date for the turbines (which will drive gasline compressors) to be operational. While this would cause completion of the export pipeline to slip past the original 1984 target, completion could still occur in 1986 as we have projected, based on expectation of normal construction delays.

Measures, internal and external, are being taken to guarantee that gas exports to Western Europe commence on schedule in October 1984, or sooner if at all possible. Large quantities of gas can be delivered through the export pipeline with only a fraction of the compressor power on line. Moreover, gas can be supplied to the export terminal by "domestic" pipelines, albeit at the cost of lowering gas supply to the Soviet economy. Some reluctance on the part of West European buyers to commit themselves to more Soviet gas is now emerging as the biggest deterrent to an early start-up on gas deliveries. Re-evaluation of the energy market outlook, disappointment over profits from


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equipment supply contracts, and strategic considerations have dampened enthusiasm for the project. Thus far, only the West Germans and French have signed contracts, although Italy, Austria, and Belgium are expected to sign agreements in the near future.

## Selling Siberian Gas in Western Europe

### Status of Purchase Agreements

West Germany. Delivering an unexpected jolt to Moscow's natural gas export plans, Ruhrgas is considering whether to exercise its option to reduce the annual baseload volume of gas by up to 20 percent. Last November, Ruhrgas agreed to buy 10.5 billion $m^3$/year (BCM), but under an option clause it will be able to take as little as 8.4 BCM annually. The contract provides for adjusting offtake requirements by up to 10 percent on 1 April and 1 October each year over the 25-year contract. Some of the change in Ruhrgas' view of the market may be attributed to new domestic gas discoveries which will enable West German gas production to increase over the next decade. A final decision on the reduction of the baseload volume was postponed until the October 1982 meeting.

Ruhrgas now is not sure that it can sell the entire 10.5 billion BCM of gas it agreed to buy at a 1984 floor price of $5.40/million BTUs. Energy demand has been falling, and demand for natural gas has been declining since 1980. Ruhrgas has three options: to take the full amount, stretch the start-up period for deliveries, and



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reduce the volume by up to 20 percent. West Germany will be paying for the Soviet gas with Deutsche marks, not with US dollars as in previous contracts. The Soviet gas price agreed to last November will be indexed to heavy fuel oil (40 percent), gas oil (40 percent), and crude oil (20 percent). Oil prices, however, are usually denominated in US dollars. Thus, there is uncertainty stemming from exchange fluctuations as well as from changes in oil prices.

France. Gaz de France, like Ruhrgas, also is considering its options to reduce baseload volume to 6.4 BCM from the 8 BCM agreed to last year. However, gas demand is stronger in France than in West Germany, and domestic supply is more limited and reserves are depleted. The French price per million BTUs was roughly the same as the West German border price when adjusted for a 35-cent transportation differential. Gaz de France will pay the Soviets in French francs, and the price is indexed to the same basket of oil commodities as in West Germany.

Italy. The ENI/SNAM negotiating team reportedly ironed out all of the contractual terms with the Soviets last November, but a formal contract has not been signed. Signing the contract may be a mere formality awaiting the end of the government's current "pause and review" stance, which was adopted after martial law was imposed in Poland. The signing could occur in May 1982, with SNAM agreeing to purchase as much as 10 BCM/year [redacted] 25X1



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SNAM is not receiving any North African gas at present because of a stalemate over price with Libya and Algeria. Italy has refused to pay anything near crude-oil equivalency prices for Libyan LNG and for Algerian pipeline deliveries. Consequently, both its LNG and "Trans-Med" pipeline facilities are idle. Depressed market conditions undoubtedly are a factor behind the Italians' extension of the current "pause." The delay has allowed them time to consider reduction of baseload import volumes from 10 BCM down to 6-8 BCM. Both SNAM and the government view ultimate signing for Soviet gas as a foregone conclusion because of the large equipment orders for the Soviet export pipeline received by Italian firms last year.

Austria. Ferngas was expected to sign a contract with the USSR in early April for only 1.3 BCM, a considerably smaller amount than the 2 BCM discussed last year. Ferngas could probably accommodate offtake as large as 2.3 BCM annually. Austria has some domestic gas production, but it will need more gas to reduce its dependence on oil.

Austria will also benefit from transit fees received for Soviet gas being shipped to France and Italy. Moreover, it will provide some pipe, equipment, and industrial tools that will help the Soviets implement their gas export plans.



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**Belgium and the Netherlands**. What could have been a sizable market for Soviet gas in the Low Countries appears to be drying up. The Dutch gas company, Gasunie, reportedly is no longer interested in buying Soviet gas. Last year they discussed purchases of up to 5-6 BCM. Lack of Soviet equipment orders was cited as the main reason for the change in attitude. Gasunie is also Western Europe's largest gas producer, and it exports about one-half its total output. While the Dutch plan to phase down exports of gas over the next decade in order to conserve this resource for future domestic use, more gas may be found offshore in North Sea waters.

Belgium is strapped for natural gas and will probably agree to buy 2 BCM in the near future. Last year Distrigaz considered the purchase of up to 5-6 BCM but then concluded a contract for very expensive Algerian LNG. This purchase drew criticism from other West European gas companies as setting a poor negotiating precedent and reflecting an unrealistic assessment of the market. Belgium faces a near term shortage over the next three years because of the expiration of its contract for Dutch gas. Distrigaz claims the Algerian contract, covering the period of expected shortage, was justified as a stop-gap measure, until either Soviet or North Sea gas becomes available.

**Other Considerations**. With oil prices remaining soft, general energy market conditions will be difficult to assess over the next few months. In the longer run, oil



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prices are expected to firm and this will affect the price and demand for natural gas. When the Ruhrgas and Gaz de France contracts were signed, the so called "oil glut" was at its worst. Prices for fuel oil and crude had dropped sharply from their 1979-1980 peak levels. At the time, there appears to have been a tendency to overestimate gas demand and import needs over the next decade or more. In West Germany, government and Veba officials have remarked that Ruhrgas overestimated the country's gas demand. But the steel industry was going into a recessionary "crisis" in West Germany, France, and Italy. Major steel companies (Mannesmann, Vallourec, and Italsider) were in poor shape financially. Soviet equipment and pipe orders were eagerly sought to buoy up employment. The tendency to overshoot on estimates of future demand reflected these pressures. The distribution of major equipment orders, by country, is summarized in table 1.

Last November a Veba official said Soviet gas may be unmarketable in 1984 at the floor price of $5.40/million BTUs agreed to in the Ruhrgas contract. Aside from the possibility that West Germany's future gas supply potential may have improved as a result of recent discoveries, West Europeans want to save some place in the future gas market for more Norwegian and U.K. North Sea gas if this becomes available. West Germany, France, and Italy are committed to energy policies which will reduce dependence on OPEC oil. The chief substitutes will be natural gas and coal,



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Table 1. Soviet Gas Export Pipeline: Distribution of Major Equipment Orders[1]

| | Ordered From | | | | | | |
|---|---|---|---|---|---|---|---|
| | West Germany | France | Italy | UK | Japan | Finland | United States |
| Head-of-line compressor station, general contract | X | X | | | | | |
| o 5 gas turbines(10 mw) | X | | | | | | |
| o 5 compressors | X | X | | | | | |
| Compressor stations(21), general contract | X | X | | | | | |
| o 42 gas turbines(25 mw) | X | | | | | | |
| o 21 gas turbines(25 mw) | | | | X | | | |
| o 63 rotor sets for 25 mw turbines | | ((X)) | | | | | (X) |
| o 63 compressors | | X | | | | | |
| Compressor stations (19), general contract | | | X | | | | |
| o 57 gas turbines (25 mw) | | | X | | | | |
| o 57 rotor sets for 25 mw turbines | | ((X)) | | | | | (X) |
| o 57 compressors | | | X | | | | |
| Compressors station and personnel buildings | | | | | | X | |
| Communications and telemetry equipment | | X | | | | | |
| Video text information systems | | | | X | | | |
| Large-diameter pipeline | X | X[2] | X | | X | | |
| Valves and fittings | | | X | | X | | |
| Large pipelayers: | | | | | X | | |
| | | | | | ((X)) | | (X) |

1 ( ) indicates order stopped by US December 1981 embargo.
(( )) indicates substitute source with firm or pending order.

2 Less than 1420 mm diameter, mostly 1020-1220 mm linepipe.

if current plans materialize. However, a continued decline in West European gas demand and a continued recession could make the Soviet floor price of $5.40/million BTUs difficult to absorb. A smaller volume of high priced gas would be easier to "roll in" and avoid buyer resistance.

**Gas Dependence and Total Energy Dependence Under Full and Scaled-Down Delivery Schedules**

Although oil remains the principal energy source in the five West European countries now expected to participate in the Siberia-to-Western Europe gas pipeline project, natural gas has become increasingly important especially in the residential-commercial and industrial sectors of their economies.[1] Total natural gas supplies to West Germany, France, Italy, Austria, and Belgium were about 125 BCM (2 million b/d oil equivalent) in 1980. The Netherlands supplied 41 percent of this amount and the USSR provided 19 percent (24 BCM) under existing contracts. Increased deliveries of Soviet gas will help offset the expected decline in Dutch gas shipments. Assuming that only one export pipeline is constructed in the 1980s, additional Soviet gas supplies to these countries would be 23-31 BCM/year in the late 1980s (see table 2). [redacted] 25X1

The annual demand for natural gas in the five countries is expected to grow to 160 BCM (2.6 million b/d oil equivalent) by

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1. The Netherlands, Spain, and Switzerland are not now expected to participate in the project. [redacted] 25X1



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Table 2. Assumed Deliveries of Soviet Natural Gas to Western Europe (excluding Finland), 1980-90

(Billion Cubic Meters)

| | 1980 | 1981 | 1982 | 1983 | 1984[1] | 1985[1] | 1986[1] | 1987 | 1988 | 1989 | 1990 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| West Germany: | | | | | | | | | | | |
| Existing | 10.9 | 11.9 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 |
| New (Low Case) | - | - | - | - | 1.9 | 4.6 | 8.4 | 8.4 | 8.4 | 8.4 | 8.4 |
| (High Case) | - | - | - | - | 1.9 | 6.1 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 |
| West Berlin | | | | | | | | | | | |
| New | - | - | - | - | - | - | - | - | 0.4 | 0.8 | 0.8 |
| France: | | | | | | | | | | | |
| Existing | 4.0 | 4.7 | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 |
| New (Low Case) | - | - | - | - | 1.5 | 3.5 | 6.4 | 6.4 | 6.4 | 6.4 | 6.4 |
| (High Case) | - | - | - | - | 1.5 | 4.9 | 8.4 | 8.4 | 8.4 | 8.4 | 8.4 |
| Italy: | | | | | | | | | | | |
| Existing | 7.0 | 8.1 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 |
| New (Low Case) | - | - | - | - | 1.4 | 3.2 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 |
| (High Case) | - | - | - | - | 1.4 | 4.6 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 |
| Austria: | | | | | | | | | | | |
| Existing | 2.4 | 2.9 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 |
| New (Low Case) | - | - | - | - | 0.2 | 0.7 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 |
| (High Case) | - | - | - | - | 0.2 | 0.8 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 |
| Belgium: | | | | | | | | | | | |
| New (Low Case) | - | - | - | - | - | - | - | - | - | - | - |
| (High Case) | - | - | - | - | - | - | - | 2.0 | 2.0 | 2.0 | 2.0 |
| TOTAL | | | | | | | | | | | |
| Existing | 24.3 | 27.6 | 25.7 | 25.7 | 25.7 | 25.7 | 25.7 | 25.7 | 25.7 | 25.7 | 25.7 |
| New (Low Case) | - | - | - | - | 5.0 | 12.0 | 22.1 | 22.1 | 22.5 | 22.9 | 22.9 |
| (High Case) | - | - | - | - | 5.0 | 16.4 | 28.2 | 30.2 | 30.6 | 31.0 | 31.0 |

1. Deliveries are assumed to begin in 1984 under new contracts with a two-year phase-in to full or reduced volume.

1990, while total energy use will rise from 13.5 million b/d oil equivalent in 1980 to 15.9 million b/d oil equivalent.[2] At the same time, deliveries of gas from the USSR to these countries will increase to 48-57 BCM/year (0.8-0.9 million b/d oil equivalent). In 1990, the combined dependence of West Germany, France, Italy, Austria, and Belgium on the Soviet Union for natural gas will be 30 to 35 percent, depending on whether the deliveries are at full or reduced volume (see table 3). Total energy dependence on Soviet sources for the group as a whole will be 5 to 6 percent. [redacted] 25X1

The most dependent country in 1990 will be Austria, at 49 percent for gas and 9 percent for total energy, but this represents little change from its current position with respect to Soviet gas. Should Belgium agree to take Soviet gas in the late 1980s, gas dependence would be 17 percent and energy dependence only 3 percent. By 1990, the three largest customers (West Germany, France, and Italy) could be relying on Soviet natural gas for as much as 35 to 36 percent of their gas needs and 5 to 7 percent of their total energy requirements (see individual country tables annexed). [redacted] 25X1

## Delivering Siberian Gas to Western Europe

### Construction

Soviet pipeline construction teams are working on at least three sections of the proposed Urengoy-Uzhgorod export pipeline. Construction has commenced at the Urengoy

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2. Projections of total energy and natural gas demand have been taken from individual country submissions to the 1981 evaluation of the Standing Group on Long-Term Cooperation of the International Energy Agency (IEA). Projections for France--not an IEA member--were taken from the French national energy plan. 25X1

Table 3. Selected West European Countries: Dependence on Soviet Natural Gas

(Percent of Total Consumption)

| | 1980 | | 1990 | |
|---|---|---|---|---|
| | Natural Gas | Energy | Natural Gas | Energy |
| West Germany (excluding West Berlin) | 21 | 3 | 33-36 | 6 |
| France | 14 | 2 | 30-36 | 4-5 |
| Italy | 26 | 4 | 30-35 | 6-7 |
| Austria | 50 | 8 | 49 | 9 |
| Belgium | 0 | 0 | 0-17 | 0-3 |
| TOTAL (five countries) | 19 | 3 | 30-35 | 5-6 |

and Uzhgorod ends, as well as in the middle in the general area between Petrovsk and the Ural Mountains.

**Pipe Orders**

Last February, the Soviets concluded a contract for an additional 1.2 million tons of 1,420 mm large diameter pipe with Mannesmann A. G. of West Germany. Delivery of 550,000 tons from this order is planned in 1982; 650,000 tons, in 1983. Further pipe orders will be placed with Japan, Italy, and France.

**Equipment Procurement**

Externally, the USSR has focused on circumvention of the US embargo of critical compressor turbine parts--rotors, stators and shafts--by continuing negotiations with the French firm Alsthom-Atlantique to produce 60 [redacted] 25X1

[redacted] extra sets of critical parts 25X1

in addition to the 40 spare sets already under contract. As of 27 April 1982, Alsthom had not signed the supplementary contract. [redacted] 25X1

[redacted] 25X1

[redacted]

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The USSR has sought and received reassurances from West European equipment suppliers and subcontractors that they fully intend to honor their contracts. Thus far, all West European firms indicated that delivery schedules for affected equipment would be met.

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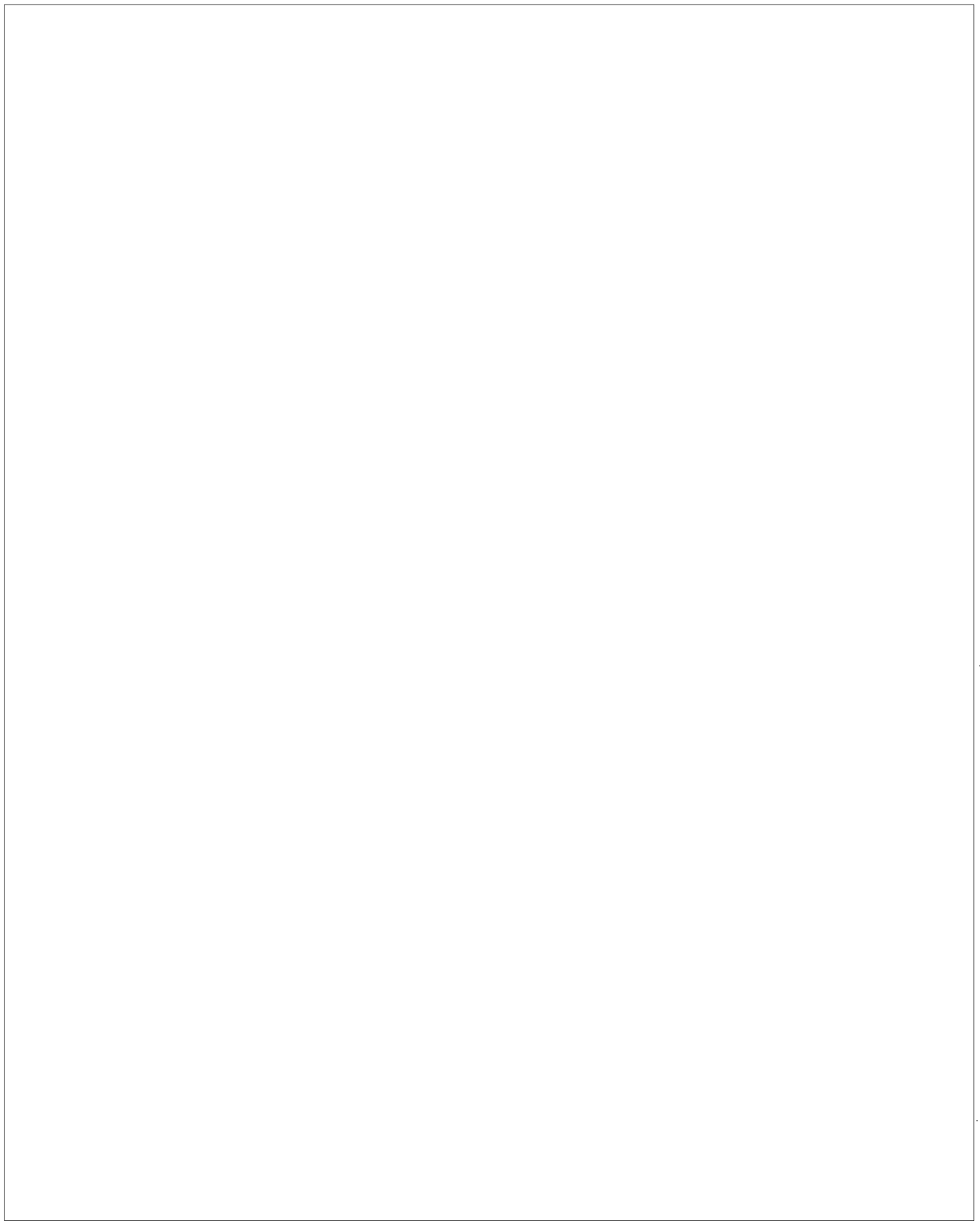

**Transit Pipeline Through Eastern Europe**

No resolution of questions concerning the routing and equipping of new transit lines through Czechoslovakia and Hungary has been reported.

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## Diversifying European Gas Supplies

Over the next two decades, West European gas consumption will probably rise both in absolute terms and as a proportion of total energy used. Moreover, existing gas contracts imply increasing dependence on non-European supplies. Some West European countries already have signed contracts that will make them dependent on the Soviet Union for more than one-third of their gas supplies in 1990. Although sizable new supplies of gas must be lined up to meet expected growth in demand, the next two to three years offer a window of opportunity during which projects could be launched that would obviate the need for additional European purchases of Soviet gas in the 1990s. These new supplies might account for 50-70 billion cubic meters (bcm) by the year 2000.

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Because of the highly capital intensive and dedicated nature of gas supply infrastructure, gas supplies cannot be efficiently redistributed by market mechanisms in the event of a sudden disruption of supplies. Consequently, some relatively expensive gas development projects might be undertaken in order to diversify supplies and minimize dependence on potentially unreliable producers.

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The Netherlands, currently Europe's largest gas supplier, would be the most reliable and economical source of additional gas. The volume of Dutch gas available in the late 1990s, however, would probably be less than 10 bcm per year.

- Gas deliveries under existing contracts--due to phase out in the early 1990s--can probably be stretched through the mid 1990s by deferring gas deliveries from earlier years when available supplies exceed demand.

- Given the size of Dutch gas reserves and the budgetary pressures confronting the Hague, we believe new export contracts might be authorized.

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Norwegian gas offers a secure, but costly alternative to Soviet gas. Norway could potentially supply an additional 40 to 50 bcm in the mid-1990s.

- Norway has huge gas reserves--presently about 2.6 trillion cubic meters--and the government believes there is considerable potential to add to this total.

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- Norway's new conservative government has already taken steps to accelerate resource development; however, additional measures would be required to reach full export potential.

- If a triangular gas deal can be arranged--using the UK as a conduit for delivering gas to the Continent--

substantial savings of time and money could be realized in delivering 10-15 billion cubic feet of gas to Europe beginning in the early 1990s.

- o Given the high cost of developing Norway's gasfields and building major trunklines to the Continent, large additional supplies of Norwegian gas would probably cost 10-20 percent more than Soviet gas.



Algerian gas can be produced and delivered to Europe at well below the cost of Norwegian gas. An additional 5-6 bcm could probably be delivered through existing Trans-Mediterranean pipelines and up to 15 bcm through a new pipeline to Spain.

- o Field development costs are relatively low and the feasibility of undersea pipeline connections to Western Europe has been proven.

- o On the other hand, Algeria's militant pricing policy, its unilateral suspension of gas deliveries to France and the United States in 1980, label it as a potentially unreliable supplier.



All the liquefied natural gas (LNG) projects under consideration to supply Western Europe would probably be expensive because of high delivery costs. Some of the projects must overcome political uncertainties.

- o Canada could supply 5 bcm of gas to Europe beginning in 1990 if technologies for exporting LNG from arctic waters are proven.

- o Although the original proposal for Nigeria's Bonny LNG project has collapsed, a scaled down version of the project--to deliver 8 bcm--might be completed.

- o The Cameroon's Kribi LNG project could supply 7 bcm in the early 1990s if political and institutional problems can be overcome.

- o Qatar has huge gas reserves in its North gasfield and might supply 8 bcm late in the 1990s.



Proposed gas pipelines from Africa or the Middle East to Western Europe are probably not politically or economically practical.

- o Any such pipeline would probably cross several unstable countries and could cost from $30 to 60 billion.

- o Supplies from a Trans-African pipeline, carrying gas from Nigeria and Cameroon to Europe would be subject to disruption in any of the countries crossed and, in any event, would probably face high transit fees.